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10/542,616	07/18/2005	Teodor Aastrup	70407-79785	7334

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EXAMINER

FITZGERALD, JOHN P

ART UNIT	PAPER NUMBER
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2856

MAIL DATE	DELIVERY MODE
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09/21/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/542,616

Applicant(s)

AASTRUP ET AL.

Examiner

John Fitzgerald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) 6,7 and 11-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,8-10 and 23-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

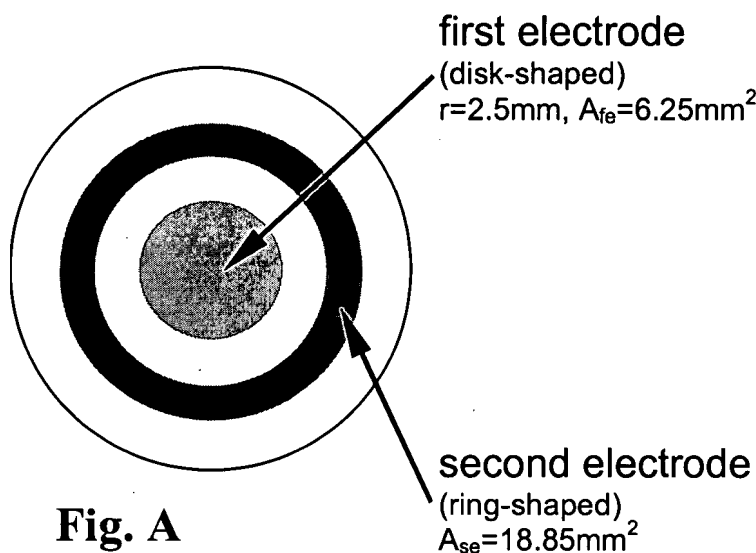
- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Response to Arguments***

1. Applicant's arguments filed 05 July 2007 have been fully considered but they are not persuasive. Addressing Applicant's arguments against the Larue reference, Applicant argues that the Larue reference fails to disclose the limitations of claim 1 and some of its dependents by stating that the Larue reference "indicates only that the first electrode is 'ring shaped' but not that the entire electrode is a solid circular shape." Applicant further argues that the 'ring shape' does not meet the limitation of claim 1 of the "first electrode having a surface area of less than 15mm^2 ". The Examiner wishes to point out that simply because the Larue reference states that the ring-shaped electrode is the 'first electrode' does not negate it from being designated as a 'second electrode' for the purposes of rejecting Applicant's independent claim 1. The terms 'first' and 'second' are not material to the claimed limitations and/or subject matter, that is, the terms can be easily reversed, and thus arbitrarily made, as the Examiner has done in the previous rejection and in the rejection repeated below, calling the 'ring-shaped' electrode (6) the "second electrode" and the 'disk-shaped' electrode (10) the "first electrode." Referring to a simplified and re-drawn Figure A below of Larue's Fig. 2B (electrode leads removed for clarity) to reiterate the Examiner's rejection. The 'first electrode' is disk-shaped, and has an area (A_{fe}) of 6.25mm^2 , which is less than 15mm^2 , as recited in instant independent claim 1, thus meeting the limitation therein. Furthermore, the area (A_{fe}) of the first electrode being 6.25mm^2 has a surface area less than the ring-shaped second electrode, the second electrode's area being 18.85mm^2 , thus meeting the other limitations recited in instant independent claim 1. Lastly, Applicant's arguments stating that "if the Larue ring shaped electrode where the shape of a circle or a disk,

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not a ring, it would have been 38.4mm^2 and not the listed 0.1885cm^2 is irrelevant. In summary, simply because the instant specification states that the first electrode “as having a defined edge distance between the outer edges of the first electrode and the crystal edge” does not preclude the outer edge of the ring-shaped electrode (i.e. second electrode in the rejection made by the Examiner” does not preclude the outer edge of the ‘ring’ having an edge distance, as clearly indicated in Lurie’s Fig. 2B and the simplified Fig. A below. The Applicant’s statement that “such geometry of the electrode must have a solid geometric shape” is false.

**Fig. A**

2. Now addressing Applicant’s arguments against the Examiner’s rejection employing the Josse et al. reference, specifically, that the Josse et al. reference fails to teach or disclose the limitation stated in the preamble of instant claim 1, being: “A thickness shear mode piezoelectric resonator for use in a sensor arrangement for detecting or measuring an analyte in a medium by mass change...” Applicant argues that since the Josse et al. patent claims a device that measures conductivity, that it precludes its use as a Prior Art reference against the instant claims, and that a prima facie case of obviousness has not been established. The Examiner respectfully disagrees.

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The Josse et al. reference clearly teaches and discloses that the Prior Art teaches (see Prior Art Figures 1 and 2 and Figs 1-6) that many other similar applications for precision resonators has been devised. That is, the addition or subtraction of mass in the region of vibration of the piezoelectric material results in a change in the resonant frequency of vibration. Typical applications include, but are not limited to: gas sensing, mass detection for very small masses, film thickness monitoring, microbe and similar biological sensing, frequency control, viscosity and density. (Josse et al.: col. 2, lines 14-25). So, contrary to Applicant's argument that the Josse et al. reference does not teach or disclose the employment of similarly constructed devices for detecting 'mass changes' is incorrect. One of ordinary skill in the art would be well aware, as shown by Josse et al., that these devices exist and would be motivated to employ the teachings (i.e. shapes of electrodes and sizes) and attempt, or obvious to try the disclosed electrode shapes of Josse et al. in devices wherein 'mass changes' are desired to be measured or ascertained. A person of ordinary skill has good reason to pursue the known options within his or her technical grasp, and in the instant case, the Josse et al. reference is clearly well within the technical field of piezoelectric resonator measurement devices. This has recently been held in *KSR, 550 U.S. at* _____, *82 USPQ2d at 1397*. Furthermore, since the limitation of 'mass change' appears in instant independent claim 1's preamble, along with functional language, it has little to no patentable weight. Functional recitation(s) using the words "for" have been given little patentable weight because they fail to add any structural limitations and thereby regarded as intended use language. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. *In re Finstewalder*, 436 F.2d

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1028, 168 USPQ 530 (CCPA 1971); *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) (“The manner or method in which such machine is to be utilized is not germane to the issue of patentability of the machine itself.”); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). When interpreting functional language, if the prior art is capable of performing the claimed function—even if not directly disclosed—it anticipates. *In re Schreiber*, 128 F.3d 1473, 1478, 44 USPQ2d 1429, 1432 (Fed. Cir. 1997); *In re Sinex*, 309 F.2d 488, 135 USPQ 302 (CCPA 1962). See also MPEP § 2114, 2115. In the instant case, the ‘structure’ of the device claimed by Josse et al. meets the limitations of instant claim 1, and is arguably capable of meeting the functional limitations recited in the preamble.

3. Lastly, in response to Applicant’s arguments that Josse et al. fail to disclose the claimed dimensions of the instant claims, the Examiner repeats the argument, as made prior and below, that one of ordinary skill in the art is well aware of variations of the sizes and shapes of the electrodes effect the resulting frequency response (i.e. resonance) in predictable ways, as disclosed/taught by Josse et al., and would be motivated to try different sizes and shapes to adjust the response (i.e. sensitivity) to selected analytes, or other types of fluid properties, as indicated by Josse et al. (Josse et al.: col. 2, lines 14-25).

Claim Rejections - 35 USC § 102

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 2, 4, 8-10, 23 and 24 are rejected under 35 U.S.C. § 102(b) as being anticipated by US 5,705,399 to Larue. Larue discloses a thickness shear mode (TSM) piezoelectric

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resonator and method for use in detecting/measuring an analyte by mass changes in a medium (capable of use with any fluid (i.e. liquids and gases) (as recited in claim 24) (see Figs 2a and 2b below) having a quartz crystal plate (16) having two flat (as recited in claim 10) crystal surfaces (first and second) wherein the first crystal surface comprises a first electrode (10) having a surface area smaller than the surface area of a second electrode (6) on the second crystal surface (as recited in claim 4) and wherein the first crystal surface has a first contacting area connected to the first electrode, as well as the second crystal surface and second electrode (as recited in claims 8 and 9) and wherein the surface area of the first electrode is 6.25mm^2 (i.e. radius = 2.5 mm) (meeting limitations of claims 1 and 2).

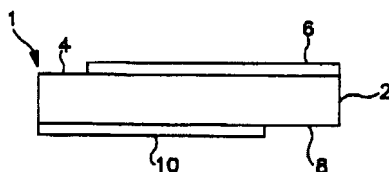


FIG. 2A

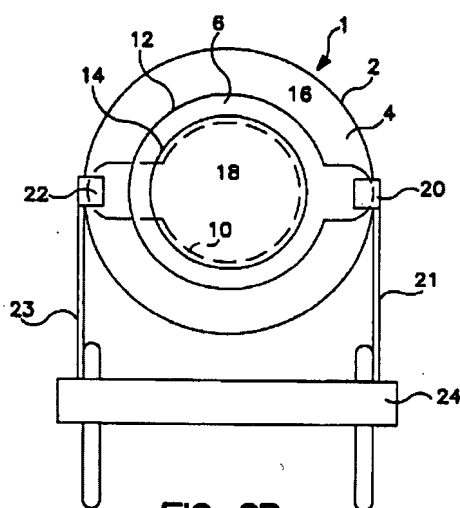


FIG. 2B

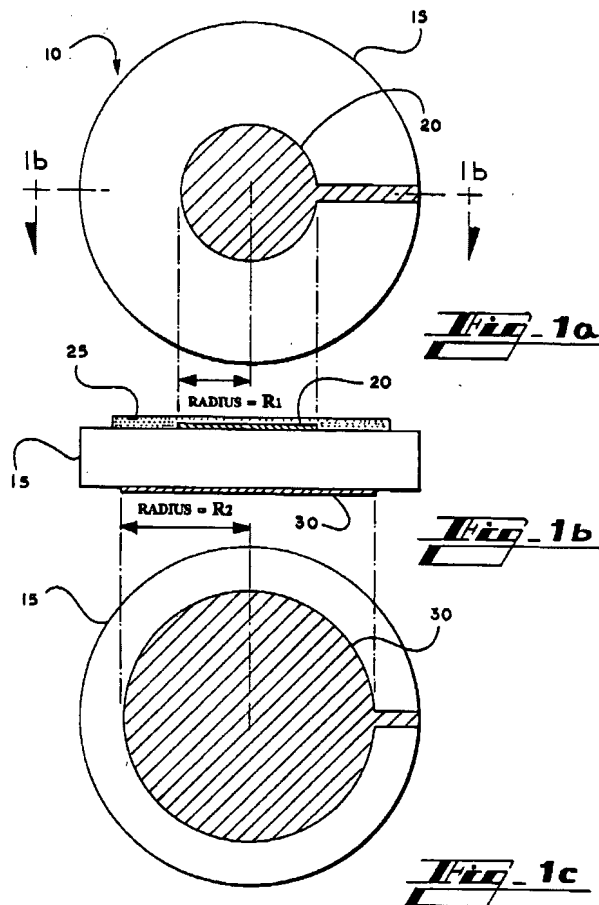
Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-5, 8-10 and 25-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over US 5,852,229 to Josse et al. Josse et al. disclose a thickness shear mode (TSM) piezoelectric resonator and method for use in detecting/measuring an analyte by mass changes (see Josse et al.: col. 2, lines 14-25, that it is well known in the art to employ similar devices for detecting and/or sensing, mass detection for very small masses, film thickness monitoring, microbe and similar biological sensing, frequency control, viscosity and density) in a medium (capable of use with any fluid (i.e. liquids and gases) (as recited in claim 24) (see Figs 1a-1c below) having a quartz crystal plate (15) having two flat (as recited in claim 10) crystal surfaces (first and second) wherein the first crystal surface comprises a first electrode (20) having a surface area smaller than the surface area of a second electrode (30) on the second crystal surface (as recited in claim 4) and wherein the first crystal surface has a first contacting area connected to the first electrode, as well as the second crystal surface and second electrode (as recited in claims 8 and 9). Although Josse et al. does not disclose specific quantitative surface area, that is, specific dimensional/geometrical aspects of the electrodes (i.e. surface area $< 15 \text{ mm}^2$ or 10 mm^2 or at least 0.05 mm^2 or is $1-5 \text{ mm}^2$ or the distances between the crystal edge and the electrode edge being at least 0.2 mm or 1 mm or 2mm) (as recited in claims 1-3, 5 and 25-28), Josse et al. does carefully teach and explain that 'conductivity of the loading medium results in the expansion of the effective electrode surface area, and that the electroded regions and their electrostatic capacitance is a result of the electrode size, shape and configuration, in other words,

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the electrode surface area. Josse et al. further teach that the geometries and/or surface areas of the first and second electrodes must differ and that the variations affect the critical frequencies in a predictable way. The variations in electrode structure can increase the sensitivity of the resonator, the ability to sense a variety of materials of interest and the ability to determine concentration of one or more materials of interest. Lastly, the variations in electrode sizes affect the resonant frequencies and anti-resonant frequencies. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the size/surface area/geometry of first electrode to any desired size/area depending on desired analytes to measured and frequencies of operation, meeting the limitations of claims 1-3, 5 and 25-28).



Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is invited to review PTO form 892 accompanying this Office Action listing Prior Art relevant to the instant invention cited by the Examiner.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Fitzgerald whose telephone number is (571) 272-2843. The examiner can normally be reached on Monday-Friday from 7:00 AM to 3:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams, can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system.

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Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



JF

09/18/2007



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